

# **Windows NT Clustered Storage Solutions for Enterprise Computing**

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**Abstract:** The vast majority of all high-performance storage subsystems in the field today rely on the use of proprietary high-end computing platforms and OS's to act as a data server, e.g., IBM RS/6000, SGI Power Challenge, Sun Ultra Enterprise, etc.. These are characterized as Server Centric and require large server CPU's to meet end-user data demands, e.g., UniTree, FileServ, etc.

In addition to Storage Centric systems, there are a small, but growing number of sites that are beginning to utilize a distributed/high-speed switched architecture, e.g., HPSS. These are referred to as Network Attached and utilize expensive and exotic storage devices and switching fabrics to meet end-user data demands. These too rely on the use of proprietary CPU's and OS's to act as "data movers", e.g., IBM SP/2.

As data demand requirements continue to increase (some 60%+ CAGR) the need for truly distributed, low-cost, non-proprietary, high-performance storage subsystems will become more critical. In fact, many analysts, including this author believe that the solution to this challenge is key to the continued growth of computing across the enterprise.

One such solution that capitalizes on both the lessons learned from Server Centric and Network Attached storage subsystems, as well as taking advantage of low-cost, scalable, and open computing platforms is based upon the use of the emerging enterprise OS – Windows NT.

## **Overview**

Windows NT is quickly maturing into a true enterprise OS, addressing all of the needs and requirements that such a term connotes. One of the key recent developments contributing towards the maturation of Windows NT has been the addition of clustering for both scalability and reliability increases.

Clustering will provide over time the ability to incrementally scale up any computing environment to meet end-user demand, along with supporting true fault-tolerance for maximum reliability. The cornerstone to success in clustering will be the storage subsystem centrally located within it. After all, when the final assessment is made, all that any of these architectures do is provide more reliability and higher availability of the single most important asset of the enterprise, "its data."

## **NT Clustered Storage Solutions**

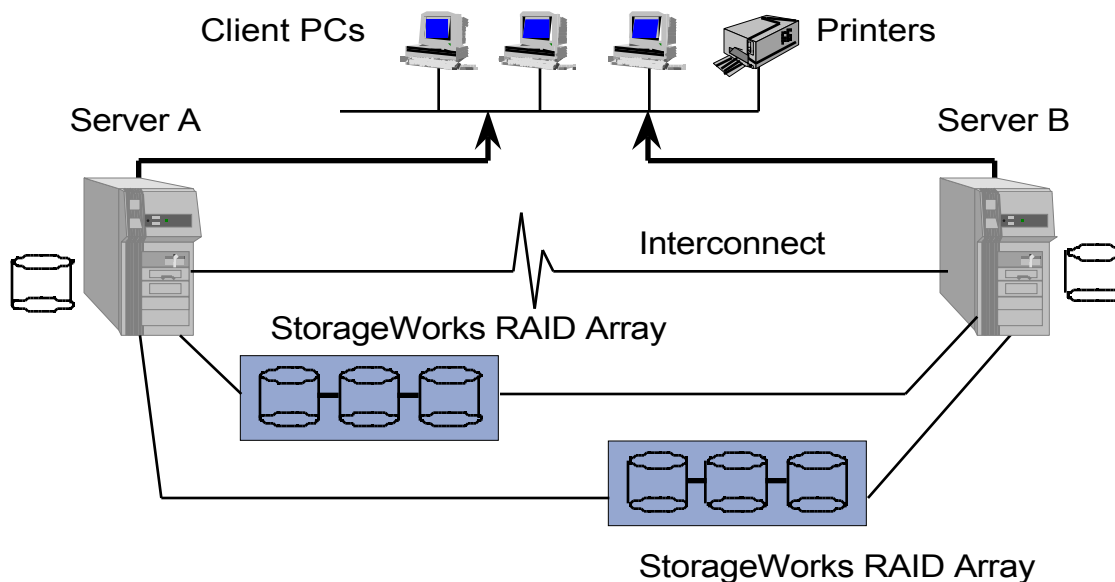
Storage options for Windows NT today run the entire gamut, from disk arrays and JBOD to tape drives and libraries to optical drives and jukeboxes. All of these are connected via

SCSI-2 FWD to host bus adapters within the server. This is a fairly straightforward architecture that is employed almost universally in the NT and UNIX spaces of the market. This architecture also has many single points of failure and performance drawbacks.

When Windows NT Enterprise Edition reaches full maturity in the late 1990's, system developers will be able to provide high-performance and fault tolerant storage systems on low-cost Standard High-Volume Servers at a fraction of the cost of UNIX and proprietary platforms in use today. These solutions will feature the following capabilities and attributes;

- n-Node (2-16+) linear scalability utilizing IA-64 "Merced" and Alpha CPU's
- Fault-tolerant computing with full application take-over
- Fibre Channel and SSA storage devices and interconnects (100 MB/s)
- Server Area Networks (ServerNet VIA) for wide-bandwidth, low-latency private network data sharing with no CPU lag
- Very Large Memory (64 bit) (1+ TB's) Support
- OS Resident Storage Management (High Ground, Seagate Software, Kodak/Avail)
- 64 bit logging file system
- TPM Performance of 20-30,000 per node

These capabilities rival, if not surpass, most of those found in standard UNIX and exotic solutions being fielded today, all without the high cost of ownership and proprietary solution limitations imposed by such products.



**Figure 1:** Microsoft Windows NT Enterprise Edition 2-node failover Cluster with Digital StorageWorks storage subsystems

## Conclusions

Regardless of your feelings towards Microsoft and its technology and business practices, you cannot ignore the juggernaut that Windows NT Enterprise Edition brings to the market. With complete support of every major platform provider except one (Sun, if you did not know already!) and the dedication of every software developer to featuring their products on this platform, it will soon become the universal enterprise computing platform. The capabilities of this platform will not be limited to the low-end file and print segments, but will span all requirements from the desktop to the data center, with solutions and capabilities at all ends of this spectrum. High-performance storage will be a major focus of these developments as time passes by.

## References

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